REMARKS

Upon entry of this Response, claims 1-20 remain pending in the present patent application. Applicants request reconsideration of the claims in view of the following remarks.

With respect to the Final Office Action of December 28, 2004, Applicants note that the rejection upheld was the same as that set forth in the Office Action of June 15, 2004. Applicants respectfully reiterate each of the arguments made in the Response to the Office Action of June 15, 2004 herein. In addition, below Applicants respond to the Examiner's response to the arguments in the Response to the Office Action of June 15, 2004 as follows.

Claims 1-4, 7-10, 13-16, 19 and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,902,994 issued to Lisson et al. (hereafter "Lisson") in view of U.S. Patent 4,945,225 issued to Gamgee (hereafter "Gamgee") and U.S. Patent 6,642,493 issued to Shiota et al. (hereafter "Shiota"). A prima facie case of obviousness is established only when the prior art teaches or suggests all of the elements of the claims. MPEP §2143.03, In re Rijckaert, 9 F.3d 1531, 28 U.S.P.Q2d 1955, 1956 (Fed. Cir. 1993). Applicants maintain that the cited combination of references fails to show or suggest each of the elements of claims 1-4, 7-10, 13-16, 19, and 20.

To begin, claim 1 as currently pending states as follows:

> 1. A method for determining a light output of a light emitting diode (LED) in a scanner, comprising:
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> applying a first current to the LED to generate the light output of the LED during a first time period;
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> obtaining a first measure of the light output of the LED during the first time period with a number of sensors in a sensor array;
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> applying an altered current to the LED to generate the light output of the LED during a second time period;
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> obtaining a second measure of the light output of the LED during the second time period with the sensors in the sensor array; and
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> detecting a saturation of the sensors in the sensor array by comparing a difference between the first measure of the light output and the second measure of the light output with a predefined difference threshold.

With respect to claim 1, the Final Office Action maintains the previous rejection stating verbatim in part:

> "Gamgee teaches a single discriminator including a light source and a sensing optical detector circuit that produces an output

corresponding to the intensity of the light source (col. 3, lines 16-25) **wherein saturation of the sensing optical detector circuit is detected by producing first and second magnitude outputs, at first and second times, relating to first and second light source intensities (col. 2, lines 49-58)** and determining when a difference between the first and second outputs are not significant as compared to a predetermined significance value/threshold (col. 2, lines 65, to col. 3, line 11)." (Office Action, pages 3-4) (Emphasis Added)

Applicants argued that the above interpretation of Gamgee was improper. Applicants cited the text at column 2, lines 49-58 of Gamgee that states:

> "The discriminating apparatus of FIG. 2 acts as the detector 11 of FIG. 1 and includes an ***incidence signal sensing means 20 sensitive to an incident radiant signal 10 comprising both radiant information signal and radiant background signal*** to generate an output sensing signal 21 of a level related to the level of the incident signal 10. Detector means 22 is responsive to the sensing signal 21 to detect an information signal component of the sensing signal 21 from the background signal level component of the sensing signal 21." (Emphasis Added)

Applicants further argued that:

> "The sensing optical circuit does not produce first and second magnitude outputs at first and second times that are related to first and second light source intensities. Rather, an "incident radiant signal 10" (presumably a radiant light) falls onto an "incident signal sensing means 20". The "incident radiant signal 10" is a single radiant signal that comprises two separate components. These components are a "radiant information signal" (presumably a data signal) and a "radiant background signal" (presumably noise). However, the incident signal sensing means 20 only generates an output of a single magnitude. The discriminator circuit as taught by Gamgee is employed to maintain a bias of the sensor to facilitate differentiation between the various components of the input signal to identify the information in the signal as opposed to the noise. This is seen in the statement of Gamgee where "the sensing means 20 is sensitive to incident radiation and generates an output sensing signal 21 of a level related to the intensity of incident radiation 10". Thus, only a single output sensing signal 21 is generated by the incident radiation on the sensor described."

In stating that Applicants' arguments were not persuasive in the Final Office Action, the Examiner cited the above argument by Applicants in the prior Response of October 12, 2004 and replied as follows:

> "The Examiner asserts that column 2, lines 49-58, of Gamgee **is only included to teach that the detector circuit produces magnitude outputs related to incident light source intensities**, specifically, "the

discriminating apparatus of FIG. 2 acts as the detector 11 of FIG. 1 and includes an incident signal sensing means 20 sensitive to an incident radiation signal 10 comprising both radiant information signal and radiant background signal to generate an output sensing signal 21 of a level related to the level of the incident signal 10." (Final Office Action, pages 6-7) (Emphasis Added)

First, Applicants point out that in the prior Office Action and the Final Office Action, the Examiner's cited column 2, lines 49-58 of Gamgee as showing or suggesting "wherein saturation of the sensing optical detector circuit is detected by producing first and second magnitude outputs, at first and second times, relating to first and second light source intensities (col. 2, lines 49-58)" as set forth above. Then, in the "Response to Arguments" on page 6 of the Final Office Action, the Examiner states that the cited portion of Gamgee was relied upon by the Examiner to teach the simple fact that the detector circuit produces magnitude outputs related to incident light source. Applicants objects to the apparent revision in the interpretation of Gamgee in this respect. Applicants' response to the Office Action of June 15, 2004 was predicated upon the rejection as stated.

In addition, Applicants have explained that Gamgee fails to show producing first and second magnitude outputs at first and second times as set forth in claim 1. Specifically, Gamgee further states in column 1, lines 10-27:

> "The apparatus of the present invention has been developed for use in relation to electronic apparatus for identification of objects including people and animals.... Such an identification system includes interrogator means which may comprise for example a directional light source for generating an information or interrogation signal and a radio frequency (RF) receiver for receiving the reply signal generated in response to the interrogation signal. Interrogator is used with one or more transponders, each of which includes a light receiver or sensor and a circuit for distinguishing light received from the light source of the interrogator means from ambient background light. In response to distinguishing the interrogation signal, the transponder is operative to transmit a coded radio frequency back to the RF receiver of the interrogator means to enable identification of the particular transponder and hence the barrier."

As described above, the circuit of Gamgee is employed to identify objects such as people and animals. In this respect, the signals are continuous analog type signals, not specific readings taken at discrete times as set forth, for example, in claim 1.

In addition, the Final Office Action maintains that Gamgee shows or suggests "determining when a difference between the first and second outputs are not significant as compared to a predetermined significance value/threshold (col. 2, lines 65, to col. 3, line 11)" as set forth above and reiterated here. In the prior Response, Applicants noted that at column 2, lines 65, through column 3, lines 11, Gamgee states:

> "The detector means 22 is responsive to an increase in the background signal level component to increase or generally maintain the discrimination of an information signal component of the sensing signal 21 generated upon reception by the incident signal sensing means 20 of an information signal superimposed on background signal level. The sensing means 20 is sensitive to incident radiation and generates an output sensing signal 21 of a level related to the intensity of incident radiation 10. The detector means 22 is responsive to the sensing signal 21 to detect in the sensing signal 21 an information signal component superimposed on background radiation component. The sensing means has a variable operating point which determines its operating characteristics. The sensing means 20 generates, in response to incident radiation 10, an output signal 21 of magnitude related to the incident radiation level up to a saturation level of the output signal 21, beyond which saturation level, any changes in incident radiation level do not produce significant changes in magnitude of the output sensing signal 21. The discriminating apparatus includes a compensating circuit 26 operative in response to any variations in background radiation intensity level within a desired range to adjust the operating point of the incident radiation sensing means 20 so as to maintain the level of the sensing signal 21 below the saturation level."

In discussing the above teaching of Gamgee at column 2, lines 65, through column 3, lines 11, in the prior Response, Applicants stated:

> "In this respect, Gamgee discusses discrimination between an information component and a background or noise component in the same signal. There are not two measures of light output of an LED that are taken at different periods of time as described in claim 1. In addition, there is no comparison between a first measure of a light output and a second measure of a light output with a predefined different threshold. In fact, no comparison is performed. Accordingly, Applicants assert that the element of "detecting a saturation of the sensors in the sensor array by comparing the difference between the first measure of the light output and the second measure of the light output with a predefined threshold" as set forth in claim 1 is not shown or suggested by Gamgee."

In the Response to Applicants' arguments, the Examiner quoted Applicants' argument above and further states:

> "The Examiner maintains that the invention of Gamgee teaches a method for detecting saturation wherein a "sensing means 20 generates, in response to incident radiation 10, an output signal 21 of magnitude related to the incident radiation level up to a saturation level of the output signal 21, beyond which saturation level, any changes in incident radiation level do not produce significant changes in magnitude of the output sensing signal 21." (Final Office Action, page 7).

Applicants respectfully disagree with this contention. The above citation to the language of Gamgee cited by the Examiner merely evidences the fact that Gamgee recognizes that sensors must operate in a relative operating range in order to provide reliable readings. In this manner, circuitry is employed to ensure that a sensor functions within an operating range typically specified by a manufacturer of the sensor. If circuitry is not properly employed to ensure a sensor stays in its operating range, then it is possible that a sensor may become saturated and the sensor output will not change appreciatively in response to a changing input. In order to avoid a saturation of a sensor, Gamgee provides for:

> "a compensating circuit operative in response to any variation in background radiation intensity level within a desire range to adjust the operating point of the incident radiation sensing means so as to maintain the level of the sensing signal below the saturation level." (Gamgee, column 2, lines 5-10)

Thus, Gamgee merely teaches the use of a compensating circuit so that operating point of the sensor is adjusted so as to prevent saturation. The compensating circuit is the subject of design before the circuit is constructed. In this respect, designers prevent the sensor from becoming saturated with the compensation circuit. There is no circuitry in Gamgee that actively detects the saturation level. Rather, at design time the saturation of the sensor is known and circuitry is generated to prevent such from happening. As such, no circuitry actually detects the saturation level of a sensor as set forth by the various embodiments of the present invention.

The various embodiments of the present invention take into account that the sensors may include saturation points that vary over time. Gamgee fails to take this concept into account. In addition, Gamgee contemplates providing a sensor that generates an analog output signal that is constant and continuous rather than producing first and second magnitude outputs at first and second times that are related to first and second light source intensities. Since multiple values are not acquired as set forth by Gamgee, it is also the case that a difference between first and second outputs are not compared with a predefined value or threshold. Accordingly, Applicants assert that the Examiner has misinterpreted the fair teaching of Gamgee in this respect.

Even in view of the statements above, the Office Action further states:

> "Therefore Gamgee teaches that the sensing means generates a first output signal related to a first incident radiation. The sensing means then generates a second output, of a plurality of subsequent output signals, related to a second incident radiation, of a plurality of subsequent incident radiations, and repeats the process up until a saturation level is detection. The saturation level is detected by determining when a difference between the first and second incident radiation levels does not produce a significant difference between the magnitude of the first and second output signals. Further, in order to determine whether the difference between the magnitudes of the first and second output signals, it is considered inherent that the difference must be compared to some type of threshold to indicate that the difference is not significant." (Final Office Action, Response to Arguments, page 8)

Applicants respectfully disagree. Gamgee merely teaches the fact that sensors can be saturated such that the output produced by them does not vary in response to a varying input once saturation is reached. In order for the circuit of Gamgee to operate properly, a compensation circuit is designed to ensure that the sensor continually operates in an operational range so that saturation is avoided. However, the avoidance of saturation is accomplished not by detecting where saturation exists as asserted by the Examiner. Rather, the saturation is avoided by providing a compensation circuit that adjusts the operating point of the sensor in an appropriate way as can be appreciated with those of ordinary skill in the art.

In addition, Gamgee teaches the generation of a constant analog signal from the sensor, not multiple readings as assumed by the Examiner. Gamgee does not generate a first output signal related to a first radiation and a second output related to a second radiation. Also, Gamgee does not repeat the process until saturation level is detected. Rather, Gamgee merely receives incident radiation and generates an output signal whereby, wherein the compensation circuit ensures that the sensor does not become saturated over time as the background noise of the incoming incident radiant light changes with time. Thus, in this respect, Gamgee teaches away from the various embodiments of the present invention.

The statement by the Examiner that "the saturation level is detected by determining when a difference between first and second incident radiation levels does not produce a significant difference between the first and second output signals" assumes too much. Gamgee does not include circuitry that makes any comparisons between any particular readings to attempt to find a saturation level. Gamgee doesn't even acknowledge the fact that the saturation levels may change over time in sensors as degradation occurs. According to embodiments of the present invention, the saturation levels are actively detected during the calibration process so that changes in the saturation levels of sensors over time can be compensated for in automated recalibration.

Not only does Gamgee fail to show or suggest determining a difference between first and second incident radiation levels, or even the detection of first and second incident radiation levels themselves, Gamgee fails to show or suggest the concept of comparing the difference between the magnitudes of the first and second output signals with a threshold. The Examiner states that such a feature is inherent in the discussion of Gamgee, even though Gamgee merely discusses the concept that sensors have saturation levels that are avoided by the proper design of compensation circuitry.

In addition, Shiota fails to show or suggest such an element as well. In particular, Shiota describes setting a voltage applied to an LED light source based upon a feedback signal from a sensor. There is no comparison of a difference between two measures of the light output of the light source with a predefined difference threshold in an attempt to detect a saturation of the sensors.

Accordingly, Applicants once again assert that the rejection of claim 1 in view of the combined references is improper. Applicants also assert that the rejection of claims 7, 13, 19, and 20 is improper to the extent these claim include elements similar in scope with that of claim 1 above. Accordingly, Applicants respectfully request that the rejection of claims 1, 7, 13, 19, and 20 be withdrawn. In addition, Applicants request that the rejection of claims 2-4, 8-10, and 14-16 be withdrawn as depending from claims 1, 7, and 13, respectively.

In addition, the rejection of claims 5, 6, 11, 12, 17, and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Lisson in view of Gamgee and

Shiota, and further in view of U.S. Patent 4,982,203 issued to Uebbing et al. (hereafter "Uebbing"). A prima facie case of obviousness is established only when the prior art teaches or suggests all of the elements of the claims. MPEP §2143.03, In re Rijckaert, 9 F.3d 1531, 28 U.S.P.Q2d 1955, 1956 (Fed. Cir. 1993). Once again, Applicants assert that the cited combination of references fails to show or suggest each of the elements of claims 5, 6, 11, 12, 17, and 18. Accordingly, Applicants request that the rejection of these claims be withdrawn.

In particular, claims 5 and 6 recite as follows:

> 5. The method of claim 1, wherein the step of detecting the saturation of the sensors in the sensor array by comparing the difference between the first measure of the light output and the second measure of the light output with the predefined difference threshold further comprises calculating the difference by determining a percent increase of the second measure over the first measure.
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> 6. The method of claim 1, wherein the step of detecting the saturation of the sensors in the sensor array by comparing the difference between the first measure of the light output and the second measure of the light output with the predefined difference threshold further comprises calculating the difference by determining a percent decrease of the second measure relative to the first measure.

In this respect, claims 5 and 6 recite the additional step of calculating the difference by determining a percent increase or decrease of the second measure of the light output of the LED over the first measure of the light output of the LED.

With respect to claims 5 and 6, the Final Office Action repeats the prior rejection stating:

> "As noted above, Lisson in combination with Gamgee and Shiota teaches many of the features of the claimed invention, and while combination teaches incrementing/decrementing the current in order to obtain an optimal value, the combination does not specifically teach determining the amount the current is to be changed using percentages.
>
> Uebbing teaches a method and apparatus for improving the uniformity of an LED printhead by compensating for the degradation in light output of a plurality of LEDs (column 4, lines 66-68) comprising obtaining the light output measures of two different pulse-width values and comparing the difference between these values to determine the percentage increase, of the second measure relative the first measure, needed to meet the desired output level deviation/difference (column 5, lines 1-22)." (Final Office Action, page 5).

Once again, Applicants disagree with the above assertion. Uebbing merely teaches measuring the light output of LEDs at two separate times to determine a degradation of light output over the time period between measurements. (See Uebbing, column 6, lines 9-24). In this respect, Uebbing is not detecting a "percentage increase" between the two measurements, but the amount of degradation in the light output. In addition, Uebbing does not suggest determining "the percentage increase, of the second measure relative to the first measure, needed to meet the desired output level deviation/difference (in this case zero)." There is no "desired output level deviation/difference" that is to be reached. Rather, the amount of light output degradation is determined between the measurements and the pulse width is adjusted to compensate. Applicants ask precisely where does Uebbing suggest the calculation of a percentage difference? Given that the degradation of the sensors over time is all that is measured, there is no need to calculate a percentage difference of the second measure relative to the first measure. The degradation is determined directly and the pulse width is adjusted to compensate. What would calculating a percentage difference accomplish? In this respect, Uebbing teaches away from calculating a percentage difference as claimed.

With respect to Applicants' arguments with respect to Uebbing, in the "Response to Arguments", the Examiner states:

> "The Examiner asserts that the invention of Uebbing is not included in the rejection of claim 1, nor is it included to teach that the current is both increased and decreased, but is only included to teach determining the amount of the current to be changed using percentages, as required in claims 5, 6, 11, 12, 17, and 18. As noted above, the combination of Lisson, Gamgee, and Shiota already teaches determining a difference between sensor output levels that is compared to a predetermined significance threshold to determine if saturation exists, as well as performing compensation by increasing and decreasing a drive signal." (Final Office Action, Response to Arguments, page 9).

While Applicants acknowledge that Uebbing is not included in the rejection of claim 1, Applicants point out that Uebbing is employed in the rejection of claims 5, 6, 11, 12, 17, and 18 as stated by the Examiner on page 9 of the Office Action. In this regard, Applicants have provided arguments particularly pointing how Uebbing fails to show or suggest determining a percent increase or decrease of the first measure over the second measure taken from the sensors. These arguments have not been addressed in the Final Office Action.

Claims 11-12 and 17-18 recite elements similar in scope with those of claims 5-6 above. Applicants assert for the reasons above, the cited combination of references fails to show the elements of claims 5, 6, 11, 12, 17, and 18. Accordingly, Applicants once again respectfully request that the rejection of these claims be withdrawn.

In addition, with respect to the motivation to combine, the Examiner states:

> "The Examiner maintains that the invention of Gamgee does show the determination of saturation stating, "sensing means 20 generates, in response to incident radiation 10, an output signal 21 of magnitude related to the incident radiation level up to a saturation level of the output signal 21, and which saturation level, any changes in incident radiation level do not produce significant changes in magnitude of the output sensing signal 21" (column 3, lines 5-11)..."

For the reasons described above, Applicants maintain the assertion that Gamgee does not show or suggest the determination of saturation levels. Rather, Gamgee merely shows or suggests the concept that sensors can be saturated and they must be compensated for properly to ensure proper operation without saturation. All assertions that Gamgee shows the concept of determining saturation especially by taking measurements and comparing differences between measurements as described in claim 1, for example, assume too much from the teachings of Gamgee and are the product of the hindsight reconstruction. Also, Applicants assert that the statements in the Office Action that "Lisson does teach altering current supplied to a light source until saturation is detected" is incorrect for the reasons provided in the Response to the previous Office Action.

CONCLUSION

Applicants respectfully request that all outstanding objections and rejections be withdrawn and that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicants' response, the Examiner is encouraged to telephone Applicants' undersigned counsel.

Respectfully submitted,

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